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THE FEASIBILITY OF COST-OUTCOME ANALYSIS
IN ONTARIO SOCIAL SERVICES:
SIX CASE STUDIES

by

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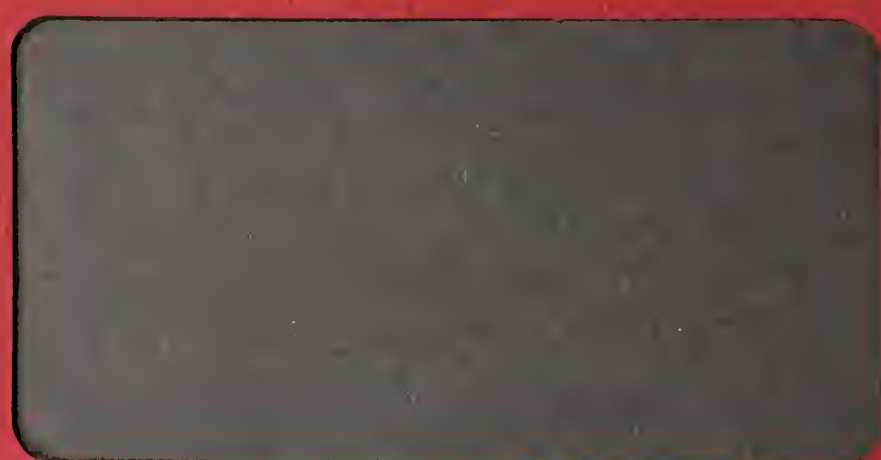
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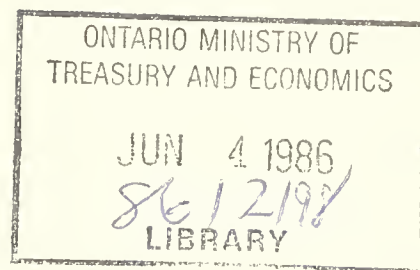


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With appreciation to six social service program administrators who did not hesitate to explore the unexplored or to contemplate innovation.

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INTRODUCTION

In a separate policy paper for the Ontario Economic Council entitled The Social Service System in Ontario (McCreedy-Rahn, 1983), the authors have addressed possible sources of motivation within the Ontario social service system with a view to the question of accountability. The authors concluded that to tie together economic costs with treatment outcomes, coupled with greater community knowledge of problem rates and problem severity would permit the government and the United Way to allocate scarce resources more optimally.

In the policy paper, the Ontario social service system is found to have been, in 1980-81, a \$951,205,716 industry. In that fiscal year, it is estimated that 87% of those funds came from federal, provincial, and municipal taxes, 10.3% from fees and endowment, and 2.7% from the United Way.

With respect to administrative auspice for the delivery of social services, 49% of the services were administered by voluntary, non-profit agencies, 43% by government departments, and 8% by profit-oriented firms, chiefly commercial day care centres.

Also discussed in the policy paper are some theoretical issues which have to do with the nature of the market for social service goods, maximization options for social service organizations, and certain methodological trends around applied research for agency information system development.

The paper concludes that unit cost data alone are misleading both for internal agency planning and for external funding purposes. True

efficiency, of course, has to do with optimizing the combination of best outcomes for least costs. But the subject of cost-outcome and cost-effectiveness analysis has been too long debated and too little demonstrated. In conjunction with the policy study, it was decided, therefore, to undertake some feasibility demonstrations in Ontario social service programs.

Findings from the Six Demonstrations

The six field demonstrations do confirm the feasibility of moving from service unit cost (cost per day, cost per treatment hour, cost per home visit) to cost per closed case and on to a cost-outcome analysis.

Each setting was unique with respect to the information elements already available for cost-outcome analysis work. Each setting differed as to where it was on the evolutionary scale of information system development. In all six settings, thought had been given and was currently being given to the subject of information system development, often in response to initiatives by the Ontario Ministry of Community and Social Services but also in response to a professional interest and awareness of the importance of the subject among management, supervisory, and line personnel.

Given the current emphasis on information system development within the Ministry, the next few years may see major advances in this regard. The crucial issues will be methodological, not technical; that is, what information should be captured is the central question. If the information requirements for cost-outcome analysis are included for attention, it should cost no more for agencies to develop an information system

which includes a cost-outcome analysis capacity - than to develop one without it.

At a methodological level, the reliability of a treatment outcome measurement scale improves as one moves from a subjective problem oriented scale format to objective goal attainment scaling, single subject charting, or the use of a standardized developmental inventory screen. But all of the scaled measurement options are better than no measurement at all. The validity of the treatment outcome data also varies among the several scale options illustrated in our six settings, but the validity issue is getting lots of attention in the literature, and progress is being made.¹

Even without objective outcome scaling, there appears to be potential utility in having cost and outcome data for single cases. This kind of information is never available in a one-shot inferential level research study using experimental and control or comparison groups. We have noted the possible utility of special file studies on cases presenting a particular type of problem, especially where low success in relation to cost is revealed and some innovation in approach to treatment seems to be needed.

¹ The more objective outcome measures lend themselves best to comparisons of cost-outcome between alternative programs. The subjectivity of many scales introduces an element of non-comparability. The highly-desirable objective is to develop measures of client functioning at intake and at closing which can be subject to operational audit. For an authoritative review of the fast emerging technology around treatment outcome measurement and the specification of interventions, see Martin Bloom and Joel Fischer, Evaluating Practice (Guidelines for the Accountable Professional), (Englewood Cliffs, Prentice-Hall, 1982).

There is also the possibility that replication among matched clients over several years can offer useful, though not fully comparable, findings as a substitute for random group designs in program evaluation. The data on cost and outcome for single cases as well as for aggregated cases in our demonstrations further confirms the feasibility of replication work, though at a lesser level of rigor than for inferential, group design studies.

In addition to the need for progress in the use of treatment outcome scales by front line workers, there are two additional aspects of information system development which need special attention: (1) worker time and activity data, (2) the definition and standardization of treatment modalities.

Most line workers have had highly exasperating experience with daily log procedures and the necessity of summarizing such data at the end of each week or month. They are, therefore, very suspicious of the whole notion of worker time use reporting. Careful design work for a computerized format with coded information categories in many agencies remains to be done. The format should require no more than five minutes a day from the line worker and should, of course, be tabulated entirely by machine or by an information clerk so that none of the compilation has to be done by the line worker.

The question of how best to define and standardize various treatment modalities is the newest and least resolved question in social work and mental health practice. It is perhaps the central issue currently in all quality assurance procedures and formats, outside of medicine. Treatment modalities such as supportive counselling, psychosocial treatment, family

unit treatment, reality therapy, transactional analysis, or behaviour modification could be coded and captured for single cases in a computerized information system. This would permit some aggregate case analysis of cost and outcome for certain kinds of problems using defined and differential approaches to treatment.

The problem of how to define and standardize the type of treatment given has long been a vital issue in inferential group design program evaluation studies. It is just as vital in single subject charting and the aggregation of single case data for an ongoing agency data base.

Judging from the letters of comment from the six administrators involved (see Appendices A to F), and from our own observation, cost-outcome analysis is feasible. If the Ministry of Community and Social Services should decide to use cost-outcome data as a measure of effectiveness and efficiency in shaping payments to operating agencies, there is no reason to believe it could not be done. It would be important to ensure that sufficient time and consultation were available to permit the operating agencies to develop the information system components needed for cost-outcome work over a reasonable period of time and at a sensible pace. Much basic information system development is already underway with Ministry help and encouragement. By and large, the only crucial information items which would have to be added to the present contemplated code lists would be worker time by case number (as well as program), some coding of treatment modalities, and better scaled treatment outcome recording on client file face sheets. The hurdle is not cost, but conceptual.

There is and has been much discussion but little evidence of the feasibility of undertaking cost-effectiveness analysis in social service

agencies. As a consequence, in carrying out these Ontario Economic Council commissioned studies of non-profit and governmental social services, the researchers invited the administrators of six diversified agencies to collaborate in field demonstrations.

General agreement to participate was reached with the six administrators in July 1981 with the understanding that the installation of whatever worker time sheets and client file treatment outcome sheets needed would be worked through in August or September, followed by data gathering on a few cases over a limited period of time between September 1981 and April 1982.

Early on, it was discovered that in some instances the cost-outcome or cost-effectiveness study could be done with existing data on a retrospective basis; in some, a prospective study was indicated. In a few of the situations, the current treatment outcome scale instruments already in place could be used; in other situations, a particular option for outcome measurement was selected and installed collaboratively. The picture which emerged is shown in Table 1. All six cost-outcome studies were agency data base studies; none were in-depth, inferential level, evaluative research studies.

Insert Table 1 here

The stated purpose of each of the six field studies was to demonstrate the feasibility of the data gathering procedures required, not to generate firm cost-outcome or cost-effectiveness findings for formal use in internal program development or external funding submissions at this point. It would be cavalier indeed to presume to see six agencies in-

TABLE INT.-1

CHARACTERISTICS OF SIX COST OUTCOME TRIALS

Program Type	Adminis- trative Auspice	Retrospective or Prospective	Cost-outcome or Cost- effectiveness	Outcome Scale Option Used
1. Children's Mental Health Centre	Nonprofit	Retrospective	C-E	Goal attain- ment scaling (objective)
2. Vocational Rehabili- tation	Public	Retrospective	C-O	Goal attain- ment scaling (dichotomized)
3. Preschool	Public	Prospective	C-O	Developmental inventory
4. Group Home	Non- profit	Retrospective	C-O	Subjective, goal oriented scale
5. Children's Aid Society	Non- profit	Prospective	C-O	Subjective, problem- oriented scale
6. Charitable Home for the Aged	Nonprofit	Retrospective	C-O	Subjective, problem- oriented scale

stall and operationalize a permanent, on-going cost-outcomes analysis capacity with less than two months of consultation and development time.

The six field demonstrations are more in the nature of preliminary pilot studies which can further the orientation of administrators and staff as to what would be involved in moving toward a cost-effectiveness analysis capacity.

The findings from each of the six locations are now presented. Comments on the studies and the approach follow the case studies.

LUTHERWOOD, INC.
(Childrens' Mental Health Centre)

Lutherwood is a non-profit children's mental health centre organized in 1970 and sponsored by the Ontario District of the Lutheran Church Missouri Synod. It is located a few miles north of Waterloo, Ontario in a wooded and open country setting. It is operated by a Board of Directors of 17 persons who are elected by the Ontario District of the Synod; 60% are to be church members within the Missouri Synod. In addition to the Board of Directors, the agency has a Professional Advisory Committee of 10 persons including specialists from social work, clinical psychology, psychiatry, theology, kinesiology, child care and education.

Lutherwood in 1982 operated four discrete programs: (1) a residential cottage program (capacity-14); (2) a day school ("day growth") program (capacity-20); (3) an out-patient clinic (initiated in September 1981); and, (4) a demonstration program in neighborhood development and primary or secondary prevention at a decentralized location in Kitchener with a neighborhood population of 4000.

Funding for Lutherwood programs is on the basis of 100% from the Ontario Ministry of Community and Social Services for operating expenditures. For capital expenditures, one-third of the funds are privately raised and two-thirds come from the Ministry, although in recent years the agency has been providing more than one-third of new capital cost.

In 1974, Lutherwood installed the Kiresuk - Sherman Goal Attainment Scaling (GAS) technology for treatment planning and for case outcome and program evaluation. One full time position is designated to coordinate and maintain the system.

The GAS system yields a score which can range from about 20 to 80. If a client is functioning at the "expected level of success" at discharge or at three month follow-up, the score is 50. Each evaluation guide, developed at intake and used to rate outcome at discharge and three month follow-up, usually focusses on from two to five major problem and goal areas. A client at discharge might be functioning above 50 in some goal areas, and below 50 in others, but the overall "average" goal achievement score could still be 50.

The way Lutherwood measures the scores at intake, using the current position of the client as the worst possible outcome, ensures that the admitting score will be in the 19-29 range. An examination of the severity of presenting problems would require an objective score on admission according to some norm. Although many questions cannot be answered because of Lutherwood's method of scoring, it does not preclude a cost-outcome analysis.

Since, at Lutherwood, GAS score data are routinely obtained and recorded for each young person in treatment, it was possible to use a

retrospective approach so far as treatment outcome data were concerned. It was agreed to focus on just two programs, the cottage program and day school program and cost data were available on the basis of cost-per-day.

There is a weakness in global per-diem cost data in that direct treatment cost cannot be examined as separate from administrative cost; nor can the components of direct treatment cost be examined differentially. Lutherwood, is, however, refining its program and cost information gathering system to get at such internal performance and cost data. Per-diem cost data, however, do include all relevant treatment and administrative costs. Social costs and opportunity costs are not included. For cost-outcome analysis of programs involving young people below regular working ages there may be justification in not including the opportunity costs but social costs properly ought to be included.

Table I-1 presents raw data for GAS scores at intake, discharge, and three month follow-up along with length of stay, for 10 cottage program cases and 10 day school cases. The costs per unit of change have also been calculated. It is evident that the costs of the court-appointed cases are higher. For instance, the average cost per unit of change of the voluntary admissions is \$1,100.22 while the average cost per unit of change for the court admissions is \$3,470.84 in the cottage program. In the day school, the same costs are \$420.40 and \$1,544.43 respectively.

Insert Table I-1 here

Cases C-9, C-10, D-9, and D-10 represent admissions under court authority, the remainder represent voluntary admissions involving a process of negotiation and joint problem identification in which the young

TABLE I-1

RAW DATA ON GAS SCORES AND LENGTH OF STAY
 Ten Cottage and Ten Day School Cases (1979-81)- Lutherwood

Client	Intake	GAS Scores		Change Scores		Length of Stay in days	Cost	Cost/Unit Change in Score
		at Discharge	at Follow-up	at Discharge	at Follow-up			
<u>COTTAGE</u>								
C-1	19.85	50.00	50.00	30.15	30.15	119	13,715.94	454.92
C-2	19.85	74.12	50.00	54.27	30.15	420	47,166.00	869.10
C-3	19.85	53.62	51.81	33.77	31.96	382	42,673.96	1,263.66
C-4	19.02	57.75	65.49	38.73	46.47	316	34,992.48	903.50
C-5	19.85	59.05	68.09	39.20	48.24	260	28,662.24	731.18
C-6	19.85	74.12	74.12	54.27	54.27	359	39,566.82	729.07
C-7	19.85	59.05	59.05	39.20	39.20	339	37,385.94	953.72
C-8	19.85	37.94	50.00	18.09	30.15	486	52,399.96	2,896.63
C-9	19.92	34.51	47.38	14.59	27.46	754	80,245.15	5,592.00
C-10	19.82	46.98	34.92	27.16	15.10	364	37,764.08	1,349.68
Average	19.77	54.71	55.09	34.94	35.32	381	41,457.26	1,574.35
<u>DAY SCHOOL</u>								
D-1	19.90	65.73	56.16	45.83	36.26	367	17,066.48	372.39
D-2	19.85	68.09	62.02	48.24	42.17	400	18,149.22	376.23
D-3	19.85	37.94	59.05	18.09	39.20	259	11,251.51	621.97
D-4	19.92	50.00	57.85	30.00	37.93	170	7,538.44	251.28
D-5	19.85	68.09	71.11	48.24	51.26	377	16,833.27	348.95
D-6	19.80	50.00	60.78	30.20	40.98	404	17,537.90	580.73
D-7	19.92	70.93	74.85	51.01	54.93	446	19,426.04	380.83
D-8	19.92	54.58	53.27	34.66	33.35	349	14,931.61	430.80
D-9	21.16	48.97	50.00	27.81	28.84	326	15,184.31	546.00
D-10	19.85	28.89	46.99	9.04	27.14	502	22,987.38	2,542.85
Average	20.00	54.32	59.21	34.31	39.21	360	16,090.62	645.20

person and parents were involved. The 20 cases examined were the most recently discharged cases.

Ministry approved per-diem rates for the period ranged from \$101.42 to \$126.95 in the cottage programs and from \$45.24 to \$58.31 in the day school program. The cottage program runs seven days a week; the day school program, five days a week.

For the analysis in Table I-2 below, four alternative definitions of success are exercised:

- (1) a change score of 25 points or more at discharge;
- (2) a change score of 25 points or more at three month follow-up;
- (3) a GAS score of 50 or more at discharge; and,
- (4) a GAS score of 50 or more at follow-up.

To properly compare the Cottage Program with the Day School Program the young clients would have to be randomly allocated to each program, or a matched pairs procedure might be used. In a retrospective study, neither is possible. The presenting scores are similar because of Lutherwood using the current functioning of the client as the worst possible outcome and there are other characteristics such as the home situation which would be necessary in comparing the two programs.

Insert Table I-2 here

Table I-2 presents an analysis for cottage program cases for the eight cases involving voluntary admissions as compared to ten cases when the two court ordered cases are included. The agency was interested in such an analysis because the staff had felt for some years that the level

Comparing Average Cost Per Successful Closed Case for Cottage Program,
when Two Court Ordered Admissions Are Excluded and Included

Cottage Program	Total Expenditure	Average Cost per Closed Case	Success Rate	Effectively Spent	Ineffectively Spent	Average Cost Per Successful Closed Case
Voluntary (N=8)	\$296,563.34	\$37,070.42	87.5%	\$259,492.92	\$37,070.42	\$42,366.19
Court also (N=10)	\$414,572.57	\$41,457.76	80.0%	\$331,658.05	\$82,914.52	\$51,821.57
Success: Change score of 25 points or more on discharge.						
Voluntary (N=8)	\$296,563.34	\$37,070.42	100%	\$296,563.34	0	\$37,070.42
Court also (N=10)	\$414,572.57	\$41,457.26	90%	\$373,115.31	\$41,457.26	\$46,063.62
Success: Change score of 25 points or more at follow-up.						
Voluntary (N=8)	\$296,563.34	\$37,070.42	87.5%	\$259,492.92	\$37,070.42	\$42,366.19
Court also (N=10)	\$414,572.57	\$41,457.26	70%	\$290,200.79	\$124,371.78	\$59,224.65
Success: GAS score of 50 or more at discharge.						
Voluntary (N=8)	\$296,563.34	\$37,070.42	100%	\$296,563.34	0	\$37,070.42
Court also (N=10)	\$414,572.57	\$41,457.26	80%	\$331,658.05	\$82,914.52	\$51,821.57
Success: GAS score of 50 or more at follow-up.						

TABLE I-2

of success with court-ordered cases was well below that for cases involving a voluntary admission. Feedback of this kind to individual front line workers, supervisors, and management would appear to have utility in searching out both the client characteristics and program elements which may be "associated", on an eye-ball and non-statistical basis, with improved levels of success. When and if some good operational hunches are sorted out, they can be tried out, again on an aggregation of single case data basis.

An alternative to the dichotomized outcome scale is to use the Sorensen-Grove Cost-Effectiveness Matrix.¹ In the Sorensen-Grove matrix, cost is isolated by several levels of treatment outcome. Rather than dichotomizing outcome (successful-unsuccessful), Sorensen and Grove would identify cost for each case for each of several degrees of change or no-change in level of client functioning. For the Lutherwood Day School outcome data, the Sorensen-Grove Cost-Effectiveness Matrix might look as in Table I-3. The treatment time is different for most of the 10 cases, ranging from 12 to 24 months. The Matrix in Table I-3 reports on all 10 cases including the two court-ordered admissions.

Insert Table I-3 here

In this demonstration, we have used two possible approaches to the depiction of cost-outcome analysis information have been identified: (1) an average cost per successful closed case for all cases classified as

¹ See James E. Sorensen and Hugh D. Grove, "Using Cost-Outcome and Cost-Effectiveness Analyses for Improved Program Management and Accountability" in Evaluation of Human Service Programs, edited by C. Clifford Attkisson, William A. Hargreaves and Mardi J. Horowitz (New York: Academic Press, 1978).

TABLE I-3

COST-OUTCOME MATRIX FOR LUTHERWOOD DAY GROWTH PROGRAM

N = 10 cases

GAS Scores-Discharge

GAS Scores-Intake

	19-29	30-39	40-49	50-59	60-69	70-79
19-29	#10	#3	#9	#4 #6 #8	#1 #2 #5	#7
30-39						
Average Cost	\$22,987	\$11,252	\$15,184	\$13,336	\$17,350	\$19,426
Marginal Cost	-\$11,735	+\$3,932	-\$1,846	+\$4,012	+\$2,076	

successful or unsuccessful (Table I-2), and (2) the Sorensen-Grove matrix which reports costs per closed case for each case, the successful and the less successful or unsuccessful cases, classified on a continuum of several levels of success and failure including a display of before and after level of functioning for each case (Table I-3).

It would seem that the Sorensen-Grove matrix is a clearly superior format. Table I-3 formats such a cost-outcome analysis for the Day School (Day Growth) program only but a similar portrayal for the Cottage program could, of course, be prepared.

However, even a dichotomized outcome scale depiction comparing the Cottage and Day Growth programs (Table I-4) provides the kind of information presumably needed for some management and board decisions around the revision or continuation of one or both programs. The crucial question, not addressed in this demonstration, would have to do with the similarities and differences around problem type and problem severity for the young people currently admitted to these two programs. The dollar contrasts in cost per successful closed case are so great as to well motivate an exploration of that question.

Insert Table I-4 here

At Lutherwood, since its treatment outcome scaling procedures are already so well developed, there would seem to be little or no additional cost involved in building cost-outcome analysis reports into the on-going information system report formats. There are limitations to using global cost per day as the service unit rather than specific time spent on each client. Some new codes capturing worker time spent in each of the two

COST-EFFECTIVENESS: LUTHERWOOD
Average Cost per Successful Closed Case for Two Programs

Program	Total Expenditure (\$)	Average Cost per Closed Case (\$)	Success Rate (%)	Effectively Spent (\$)	Wasted (\$)	Average Cost Per Successful Closed Case (\$)
1. Day School	160,906.16	16,090.62	80.0	128,724.92	32,181.24	20,113.27
2. Cottage	414,572.57	41,457.26	80.0	331,658.05	82,914.52	51,821.57
Success: Change score of 25 points or more at discharge.						
1. Day School	160,906.16	16,090.62	100.0	160,906.16	0	16,090.62
2. Cottage	414,572.57	41,457.26	90.0	373,115.31	41,457.26	46,063.62
Success: Change score of 25 points or more at follow-up.						
1. Day School	160,906.16	16,090.62	70.0	112,634.31	48,271.85	22,986.59
2. Cottage	414,572.57	41,457.26	70.0	290,200.79	124,371.78	59,224.65
Success: GAS score of 50 or more at discharge.						
1. Day School	160,906.16	16,090.62	90.0	144,815.54	16,090.62	17,878.46
2. Cottage	414,572.57	41,457.26	90.0	331,658.05	82,914.52	51,821.57
Success: GAS score of 50 or more at follow-up.						

programs more accurately might need to be added to present worker time sheets.

It would appear that Lutherwood could move to a comparative cost-effectiveness analysis capacity for its Cottage and Day Growth programs with relatively little difficulty by adding a standardized test of problem severity at intake and by individualizing cost per case.

VOCATIONAL REHABILITATION PROGRAM
(Ontario Ministry of Community and Social Services)

The Waterloo Area Office of the Ministry serves four county territories: Waterloo, Wellington, Bruce and Grey. While for purposes of province-wide planning and policy development, the former Children's Division and Adult Division were integrated in 1981 at the Queen's Park level of Ministry structure, at the Area Office level they are only gradually being integrated.

Under the Adult Services Division at the Area Office level, the Ministry carries direct administrative responsibility for any Schedule I Mental Retardation Facilities located in Area Office territory, the income maintenance program under the Family Benefits Act and for the Vocational Rehabilitation Program under the Vocational Rehabilitation Services Act. Any Schedule I mental retardation facilities located in the Area Office territory are administered directly by the Regional Office Director. For all other adult social services, non-profit, profit-oriented or municipal agencies deliver the service usually under some kind of a contract or legislated funding subsidy from the Ministry's Area Office Adult Services Division Manager.

However, even for the Ministry administered Vocational Rehabilitation Program, only the Rehabilitation Counsellors are employed directly by the Ministry; much of the assessment service and all of the restoration (medical, dental, optometric, hearing, prosthetic) and training services are provided by the Ministry under contracts with nonprofit and profit-oriented workshop agencies, restoration supply providers, community colleges, universities, and occasionally, employers. A specialized job placement service is also provided by a Ministry employed Counsellor.

The Rehabilitation Counsellors are primary workers or case managers responsible for intake, the coordination of assessment work, the purchase of restorative and training services, job placement and the monitoring of all work around each case. Completed cases are followed for three months and then closed. All closed cases are followed up at twelve months past closure. The Ministry's job description for the Rehabilitation Counsellor includes the following statement of purpose for the position:

To rehabilitate persons whose physical, mental and emotional disabilities hinder their gainful employment and contribution to society through (a) a program of assessing their vocational potential, recommending and engaging training and other vocational services and placements, (b) the development of new and existing vocational resources, and (c) participation in program and policy development.

For the purposes of our cost-outcome feasibility demonstration, arrangements were made through the Area Manager for Adult Services for access to data on 77 vocational rehabilitation cases closed during the period September through December 1981. This was a retrospective analysis.

With respect to cost per closed case, all cost information around purchased assessments, restoration, training, tools and equipment is available from standard financial accounts. The cost of Rehabilitation Counsellor time for each closed case, to be added to the purchased services cost, was estimated from individual worker's estimates (requested periodically) of percentage of time in a sample week spent on direct service, administration, and public relations or resource development. To estimate a fair share of General Administration time and cost for each closed case, aggregate administration cost per month was divided by the average number of active cases per month (September through December 1981) to get an average administrative cost per active case per month. This monthly cost was multiplied by the number of months each closed case was in active status.

With respect to outcome measurement, the Ministry's Rehabilitation Closure Report, Form 70-00-022 (Nov.2/76) requires that each Rehabilitation Counsellor, when the case is closed, fill out a "Status At Closure" section by checking one of the following categorical options: ☐ Self-Employed, ☐ Sheltered Employment, ☐ Home-bound Employment, or ☐ Housewife or Homemaker. One may add an additional category: ☐ Unemployed.

For scaling purposes, there is a problem if one attempts to treat "Housewife or Homemaker" as one option for paid employment.

If we remove "Housewife or Homemaker" from the paid employment list, we can note that there is an underlying continuum behind the categories running from greatest to least autonomy. However, it should be observed that the Vocational Rehabilitation Services Act and Regulations

do specify that improved success as a "Housewife or Homemaker" is a desirable goal in itself for persons not capable of contemplating paid employment. However, for the particular analysis to follow, we will set this category aside. For this particular exercise in cost-outcome analysis, we have consolidated the categories into a three point ordinal scale as follows:

- | | | |
|---|----------------|---|
| A | High Success | - regular employment or self-employed |
| B | Medium Success | - sheltered or homebound employment |
| C | Low-No Success | - unemployed (if the client withdrew from service, this is also defined as low-no.) |

Among the 77 closed cases examined, 5 were closed with a special status of "independent student" and 1 was closed with the special status of "hospitalized". These 6 cases plus 3 cases closed as ineligible for service, have been removed from the analysis, leaving 68 cases.

Each Rehabilitation Closure Report records "Disability-Cause Diagnosis". The problem types for the 68 cases can be catalogued as in Table II-1.

Insert Table II-1 here

The Rehabilitation Closure Report also includes a section on "Services Provided"; the following options are listed: ☐ assessment, ☐ restoration, ☐ training, ☐ tools and equipment, and ☐ other.

For a cost-outcome analysis, there may be utility in taking a problem-entity approach to the analysis rather than an overall program or all-problems-together approach. With this in mind, our demonstration

TABLE II-1

DIAGNOSED PROBLEMS FOR SIXTY-EIGHT
VOCATIONAL REHABILITATION CLIENTS

Problem		Frequency	Percentage
#1	Learning disability	10	14.7
#2	Sacroiliac backache	2	2.9
#3	Blindness	1	1.5
#4	Alcoholism	16	23.5
#5	Friedreich's Ataxia	1	1.5
#6	Paraplegia	2	2.9
#7	Cerebral Palsy	3	4.4
#8	Mental retardation	9	13.2
#9	Menieres syndrome	1	1.5
#10	Amputation or limb damage	3	4.4
#11	Kidney failure	1	1.5
#12	Congenital Reverse Kyphosis	1	1.5
#13	Epilepsy	3	4.4
#14	Multiple Sclerosis	3	4.4
#15	Neoplasm of Esophagus	1	1.5
#16	Congenital Nystagmus	1	1.5
#17	Guillain Barre Syndrome	1	1.5
#18	Asthma	1	1.5
#19	Arthritis	3	4.4
#20	Muscular dystrophy	1	1.5
#21	Schizophrenia	3	4.4
#22	Emphysema	1	1.5
Total		68	100.0

Orthopaedic: #2, #5, #6, #7, #10, #12, #14, #17, #19, #20

Mental Retardation: #8

Alcoholism: #4

exercise will focus on three problem areas: orthopaedic problems (#2, #5, #6, #7, #10, #12, #14, #17, #19, #20), mental retardation (#8), and alcoholism (#4). The first is predominantly a biological problem area while the second and third reflect a difficult mix of both biological and social-cultural factors.

Table II-2 presents the raw data for 20 orthopaedic cases including cost and rated level of success for each case.

Insert Table II-2 here

From Table II-3 we see that 59% of the seventeen orthopaedic cases closed between October and December 1981 achieved a high success level or outcome. Eighty percent of total expenditures was invested in these cases. Also 35% of cases were closed at a low-no success level with 10% of total expenditures deployed.

Insert Table II-3 here

Table II-4 and II-5 are similar to Tables II-2 and II-3 but in this case are for the M-R cases. From Table II-5, it is observed that the proportion of cases to expenditures at each level of success is fairly even.

Insert Tables II-4 and II-5 here

In Tables II-6 and II-7 the same analysis is repeated for the alcoholism cases. Here, the proportion spent on successful cases was greater than the number of cases whereas the proportion spent on low-no success cases was less than the proportion of cases. Two questions arise: would

TABLE II-2

ORTHOPAEDIC CASES: COST AND OUTCOME

A - High success (regular employment or self-employed)
 B - Medium success (sheltered or homebound employment)
 C - Lo-no success (unemployed or withdrew)

Case No.	Days Open	Purchased (\$)	Rehabilitation Costs (Direct) (\$)	Rehabilitation Costs (public relations or resource development) (\$)	Administration (\$)	Total (\$)	Out-Come
2	219	143	955	77	751	1,926	C
7	182	150	794	64	624	1,632	C
10	229	305	998	80	785	2,168	C
15	1564	11,079	6,819	547	5,365	23,810	A
16	55	150	240	19	189	598	A
17	47	143	205	16	161	525	A
23	238	2,020	1,038	83	816	3,957	A
26	36	150	157	13	123	443	C
33	355	2,520	1,548	124	1,218	5,410	H
36	489	5,335	2,132	171	1,677	9,315	B
39	342	--	1,491	120	1,173	2,784	C
50	1001	10,002	4,364	350	3,433	18,149	A
51	99	156	432	35	340	963	C
55	476	2,755	2,075	167	1,633	6,630	A
63	338	156	1,474	118	1,159	2,907	A
64	392	2,296	1,709	137	1,345	5,487	A
67	287	588	1,251	100	984	2,923	A
68	279	10,725	1,216	98	957	12,996	H
69	59	3,783	257	207	202	4,449	H
70	671	5,224	2,926	235	2,302	10,687	A
Total	7358	57,680	32,081	2,761	25,237	117,759	
Average	368	2,884	1,604	138	1,262	5,888	

TABLE II-3

ORTHOPAEDIC CASES: COST-OUTCOME ANALYSIS

High Success		Medium Success		Low-no Success	
Case No.	Cost (\$)	Case No.	Cost (\$)	Case No.	Cost (\$)
15	23,810	36	9,315	2	1,926
16	598			7	1,632
17	525			10	2,168
23	3,957			26	443
50	18,149			39	2,784
55	6,630			51	963
63	2,907				
64	5,487				
67	2,923				
70	10,687				
Total	75,673	Total	\$9,315	Total	9,916
Average	7,567	Average	\$9,315	Average	1,653
80% (expenditures)		10% (expenditures)		10% (expenditures)	
59% (cases)		6% (cases)		35% (cases)	

Note: The three housewife cases are not classified in this table.

TABLE II-4

M-R CASES: COST AND OUTCOME

A - High success (regular employment or self-employed)

B - Medium success (sheltered or homebound employment)

C - Lo-no success (unemployed or withdrew)

Case No.	Days Open	Purchased (\$)	Rehabilitation Costs (Direct) (\$)	Rehabilitation Costs (public relations or resource development) (\$)	Administration (\$)	Total (\$)	Out-Come
18	61	423	266	21	209	919	A
28	616	1,500	2,686	215	2,113	6,514	B
29	890	981	3,880	312	3,053	8,226	B
30	613	1,358	2,673	215	2,103	6,349	B
37	668	300	2,912	234	2,291	5,737	B
41	246	1,078	1,072	86	844	3,081	B
43	753	7,396	3,283	264	2,583	13,526	C
59	64	280	279	22	220	801	C
77	19	194	83	7	65	349	C
Total	3930	13,501	17,134	1,376	13,481	45,501	
Average	437	1,501	1,904	153	1,498	5,056	

TABLE II-5
M-R CASES: COST-OUTCOME ANALYSIS

High Success		Medium Success		Low-no Success	
Case No.	Cost (\$)	Case No.	Cost (\$)	Case No.	Cost (\$)
18	919	28	6,514	43	13,526
		29	8,226	59	801
		30	6,349	77	349
		37	5,737		
		41	3,081		
Total	919	Total	29,907	Total	14,676
Average	919	Average	5,981	Average	4,892
2% (expenditures)		66% (expenditures)		32% (expenditures)	
11% (cases)		56% (cases)		33% (cases)	

more expenditure on those cases in the low-no success category have improved the success rate or were the counsellors astute enough to close cases before the expenditure per case became unrealistic?

Insert Tables II-6 and II-7 here

The Utility of Such Findings

For each of the three problem entities, high or medium success was achieved with from 67% to 65% of the cases. This represents solid achievement and can be a source of some reassurance to all concerned. It can also provide a benchmark for reference in subsequent quarters or from year to year.

On the other hand, from 35% to 33% achieved no real progress. Further, the case number (disguised here) of those cases which did not improve is known. In hospital settings, special chart studies might be done to try to find out what if any characteristics such patients had in common, or, what in the treatment approach might be changed. The same kind of a special case file study could be done around vocational rehabilitation cases with low-no success.

The average cost per successful closed case was \$7,567.00 for orthopaedic cases, \$919.00 for the one high success mental retardation case, and \$2,741.00 for alcoholism cases. While one would not wish to depend on such figures from a single three month time period, over a period of time, replications of this analysis would begin to provide some pretty dependable estimates on cost per successful closed case. Additional special case file studies of the high success cases could give some indica-

TABLE II-6

ALCOHOLISM CASES: COST AND OUTCOME

- A - High Success (regular employment or self-employed)
- B - Medium success (sheltered or homebound employment)
- C - Low-no success (unemployed or withdrew)

Case No.	Days Open	Purchased (\$)	Rehabilitation Costs (Direct) (\$)	Rehabilitation Costs (public relations or resource development) (\$)	Administration (\$)	Total (\$)	Outcome
8	118	12	514	41	405	972	C
9	155	18	676	54	532	1,280	C
11	34	18	148	12	117	295	A
12	71	50	310	25	244	629	A
13	102	18	445	36	350	849	C
14	247	-	1,077	86	847	2,010	C
46	300	1,044	1,308	105	1,029	3,486	A
47	206	269	898	72	707	1,946	A
48	126	110	549	44	432	1,135	A
49	29	12	126	10	99	247	C
53	150	179	654	53	515	1,401	A
57	62	150	270	22	213	655	C
72	293	524	1,277	103	1,005	2,909	A
73	286	107	1,247	100	981	2,435	A
74	711	5,600	3,100	249	2,439	11,388	A
75	193	214	841	68	662	1,785	A
Total	3083	8,325	13,440	1,080	10,577	33,422	
Average	193	520	840	68	661	2,089	

TABLE II-7

ALCOHOLISM CASES: COST-OUTCOME ANALYSIS

High Success		Medium Success		Low-no Success	
Case No.	Cost (\$)	Case No.	Cost (\$)	Case No.	Cost (\$)
11	295			8	972
12	629			9	1,280
46	3,486			13	849
47	1,946			14	2,010
48	1,135			49	247
53	1,401			57	655
72	2,909				
73	2,435				
74	11,388				
75	1,785				
Total	27,409			Total	6,013
Average	2,741			Average	1,002
82% (expenditures)				18% (expenditures)	
62% (cases)				38% (cases)	

tion of the kinds of cases for which high success at a certain cost could be predicted.

Finally, information is produced from which to decide whether to retain programs for certain problem entities, or to design a planned alternative program for certain problem entities on which comparative cost-outcome results will then be calculated. A randomized allocation of clients to the two programs (on-going and planned alternative) would be desirable and for the comparison period, closer monitoring of treatment activity might be necessary.

Perhaps the greatest single weakness in this feasibility demonstration has been the reliance on average time and cost figures for all active cases in one month (October 1981). It is likely that the amount of Rehabilitation Counsellor time has varied considerably from the average for individual cases. To capture direct service time more accurately for each case would require the use of a daily worker time form to be completed each day's end and dropped in the out tray.

HESPELER PRE-SCHOOL EDUCATION CENTRE

The Hespeler Pre-school Education Centre, located at 26 Cooper Street, Cambridge (Hespeler), Ontario, is one of five day nurseries administered directly by the Department of Health and Social Services, Regional Municipality of Waterloo. In addition to this network of municipally administered day care centres, there were forty-four voluntary nonprofit and twenty-six profit oriented nursery schools and day care centres serving the Regional Waterloo population area in 1982.

The Hespeler Centre serves seventy pre-school children of whom about 60% are children with no problems and about 40% are special needs children who are suffering from varying degrees of developmental deficit. None of the children are mentally handicapped. The Centre, then, illustrates the normalization approach to remedial education with pre-school children and the use of relatively normal children as role models and sources of peer influence for other children with special needs.

The Hespeler Centre, however, does not simply rely on the contribution of normal children within a growth inducing milieu, but provides highly individualized remedial education and training attention as well. Prior to September 1981, the Denver Developmental Screening Test, the Portage Test, and other screening tests were used to identify the children who might be in deficit and to pin-point areas of deficit. Such information is used to guide the selection and use of specific remedial routines with individual children around small motor skills, social skills, expressive language ability, etc. When indicated, special diagnostic studies for individual children are arranged, particularly when the remedial work routines do not lead fairly promptly to improved functioning.

In the Hespeler Pre-school Education Centre, some of the seventy-three children attend morning sessions, the remainder attending in the afternoon. The special needs children attend five half-days a week, and the regular children just three half-days a week, with an occasional exception.

Beginning in September 1981, the Hespeler Centre began the installation and use of a new screening instrument, the Developmental Inventory

Scales for Children (DISC) supplementing the Denver Developmental Screening Test.¹

The DISC is a primary screening test to detect developmental problems in infants and preschoolers, and covers the age range of birth through five years (60 months). Eight developmental areas are assessed: fine motor, gross motor, receptive language, expressive language, visual attention and memory, auditory attention and memory, self-help and social skills.

For each skill area the range of possible scores is from 1 to 27. Also, for each skill area, percentiles have been established for a normative sample of children at eleven age levels: 0-3 months, 4-6 months, 7-12 months, 13-18 months, 19-24 months, 25-30 months, 31-36 months, 37-42 months, 43-48 months, 49-54 months, and 55-60 months. An illustration for one of the six skill areas, fine motor skills, is reproduced in Table III-1.

Insert Table III-1 here

A fine motor skills score of 17, for example, was the best that any of the 13-18 month old or 19-24 month old normal children obtained. At a score of 17, 100.00% of the children are accounted for. However, among the 25-30 month old children, 64.17% got a score of 17 or less which means, conversely that 35.71% of these normal children got a score of 18 or higher; indeed, at least a few children got a score as high as 23, among the 25-30 month old children used to age norm this instrument.

¹ This new, standardized developmental screening instrument had just been completed by Jeanette Amdur, Ph.D., Psychologist and Co-ordinator of the Child and Family Centre, Kitchener-Waterloo Hospital, with the collaboration of Marion Mainland, M.A. (Psychology).

TABLE III-1

DEVELOPMENTAL INVENTORY SCALES FOR CHILDREN
FINE MOTOR

Percentage of Children in Normative Sample

Obtained Score	Age in Months									
	0-3	4-6	7-12	13-18	19-24	25-30	31-36	37-42	43-48	49-54
1	2.08									
2	12.50									
3	72.58									
4	100.00	46.15								
5		71.79								
6		84.62	3.92							
7		94.87	41.18							
8		100.00	74.51							
9			88.23	6.38						
10			96.08	12.77						
11			96.08	25.53	2.17					
12			100.00	74.47	6.52					
13				91.49	47.83					
14				93.62	67.39	14.29				
15				95.75	89.13	23.81	6.78			
16				97.87	93.48	42.86	8.48			
17				100.00	100.00	64.29	11.86			
18						76.19	22.03			
19						83.33	30.51	3.33		
20						92.86	38.98	10.00	1.61	
21						97.62	67.80	13.33	3.23	
22							83.05	26.67	4.84	
23						100.00	91.53	55.00	8.07	
24							94.92	70.00	29.03	
25							94.92	86.67	64.52	7.27
26							100.00	90.67	83.87	25.45
27								100.00	100.00	100.00

The developers of the DISC instrument have defined the 75th percentile for a give age range as reflecting a "normal" level of functioning. Among 25-30 month old children, then, a DISC score of 18 or higher designates a normal level of functioning (percentile standing of 76.19%). A child with a percentile standing of 60-74% is classified as "questionable"; a standing of 50-59% is classified as "borderline abnormal"; a standing of 0-50% is "abnormal".

Table III-2 below reports the DISC scores and percentile standing (PS) in October 1981 and after five months of remedial work in April 1982 for one male child (7M) covering six of the eight skill areas. Ratings for the remaining two skill areas could not be obtained in October 1982 due to test refusal or absence.

Insert Table III-2 here

The absence of complete data on all eight skill areas is not vital here since we are seeking only to demonstrate how the DISC instrument and its percentile tables can be used to derive a single overall score for a child at two points in time. In Table III-2, we have averaged the percentile standings across all six skill areas for which we have both October and April data. The average percentile standing level for 7M is found to be 1.21% in October, 16.20% in April with an improvement or change in standing of 14.99 percentile points. The plus sign for the three skill areas in which the child's percentile standing was 0.00 in October 1981 reminds us that the actual improvement in those skill areas may be something greater than the difference reported since the instrument does not make provision for negative scores below 0.00.

TABLE III-2

RAW SCORES AND PERCENTILE STANDING FOR ONE CHILD (7M)
IN SIX SKILL AREAS, OCTOBER 1981 AND APRIL 1982

Skill Area	October 1981		April 1982		Improvement in Percentile Standing (IPS) ²
	Score	PS ¹ :54 months	Score	PS ¹ :59 months	
Fine Motor (FM)	25	7.27	26	53.32	46.25
Receptive Language (RL)	22	0.00	24	12.68	12.68
Expressive Language (EL)	20	0.00	22	0.00	0.00
Gross Motor (GM)	22	0.00	23	26.76	26.76
Auditory-Attention/Memory	21	0.00	23	0.00	0.00
Visual-Attention/Memory	21	0.00	24	4.23	4.23
Self-Help (SH)		-			-
Social Skills (SS)		-			-
Average		1.21		16.20	14.99

¹ PS - Percentile Standing. Normal: 75% up.; Questionable: 60-74%;
Borderline Abnormal: 50-59%; Abnormal: 0-49%

² IPS - Improvement in Percentile Standing.

Also note that in a developmental area such as expressive language in which child 7M was at 0.00 percentile standing in both October and April, the absence of negative scores in the percentile table makes it impossible to credit some progress which was actually made; this child's test score for expressive language did improve from 20 to 22, but the amount of improvement still did not bring the child above the 0.00 percentile standing. Use of the DISC instrument and its percentile tables does report improvement in each developmental area in which a child is at least a little above 0.00 percentile standing, but not for a child who begins and ends at some negative percentile level below 0.00 percentile standing. This inevitable limitation in any standardized developmental inventory instrument can be compensated informally by a separate look at raw score improvements below the 0.00 percentile standing level.²

It should be noted that the basic purpose of the DISC instrument as a developmental screen is to uncover the specific skill areas in which a child may be in need of remedial work. Study child 7M was at borderline abnormal in fine motor skills (53.52 PS) at the end of the five month treatment period, but remained very low in PS on the other five skill areas. To average this child's PS percentages to get a single value on overall functioning level (a mean PS in April 1982 of 16.20%) over six skill areas has no usefulness at all to the early childhood education specialists working with these children from day to day at the Hespeler Pre-School Education Centre. However, for cost-outcome analysis purposes,

² A brief explanation of a further option for outcome measurement based on chronological age gain in months will be separately illustrated at the close of this discussion.

six or eight separate percentile standing ratings for a given child are equally useless. A single overall rating across all skill areas is essential.

In Table III-3 below we present, for each of the six study children, the overall, average PS ratings for October 1981, April 1982, and the consequent improvement in percentile standing for each child (IPS).

Insert Table III-3 here

All six study children classify as of October 1981 as abnormal in the depth of their developmental deficits. While improvement is apparent at the end of five months of remedial work, with the exception of child 2M who registers no improvement in percentile standing, the children are still functioning at an abnormal level, i.e., below 50.

Pre and post DISC scores for each of the project children were obtained as of November 1, 1981 and March 31, 1982.

It was agreed that the new DISC screen would be administered to about ten special needs children in October 1981 and again in April 1982, as a measure of treatment outcome. Eleven special needs children were initially selected for the study, anticipating some loss from family moves. Complete data for six children are reported here.

It was further agreed that a Worker Activity and Time Report Sheet would be completed each day by each teacher to report individual or small group remedial work time with any or all of the eleven initial project children. The plan was to estimate total program cost for each of the special needs children by adding individual remedial work time to the basic cost for regular and special children in general milieu activities

TABLE III-3

AVERAGE PERCENTILE STANDING IN OCTOBER 1981 AND APRIL 1982
OVER SIX SKILL AREAS FOR SIX STUDY CHILDREN:
HESPELER PRE-SCHOOL EDUCATION CENTRE

Child	PS ¹ October 1981	PS ¹ April 1982	IPS ²
2M	0.00	0.00	0.00
3M	11.50	28.04	16.54
5F	0.00	20.66	20.66
7M	1.21	16.20	14.99
9F	4.85	19.17	14.32
11F	1.21	26.29	25.08

¹ PS - Percentile Standing. Normal: 75% up.; Questionable: 60-74%;
Borderline Abnormal: 50-59%; Abnormal: 0-49%

² IPS - Improvement in Percentile Standing.

In October 1981, the first DISC ratings for the study children were prepared, following a training period conducted by a DISC trainer using a video-tape demonstration. Two of the eleven children moved away. Of the remaining nine children, absence or test refusal eliminated three. Complete data were obtained on six. The findings from the Hespeler Pre-school Education Centre cost-outcome feasibility demonstration are presented in the following five tables.

Table III-4 presents the cost for each study child for the period November 1, 1981 to March 31, 1982. We see that the average cost per study child for the five month period was \$1258 as compared to \$651 for a regular child. The difference in cost is a reflection of two factors: the special needs children attend five half days a week instead of three half days as for the regular children, and the special needs children receive individualized remedial attention from individual teachers, which the regular children do not.

Insert Table III-4 here

It must be noted that since the two implicit "programs" (one for regular children and one for special needs children) are just one program at an operational level, no separate financial accounting is possible for the two groups of children. As a result, estimates of separate costs must be made as in our illustration.

It can be noted here that there were 844 hours of staff volunteer time (including students) contributed to the Centre program during the five month period. These 844 volunteer hours represent 19% of the total unpaid volunteer and paid staff hours (4441 hours) for the study period.

TABLE III-4

COST FOR SINGLE CASES: HESPELER PRE-SCHOOL EDUCATION CENTRE

(For a treatment period of five months,
November 1, 1981 to March 31, 1982)

Child	Maximum Centre Hours ¹	Special Remedial Hours ²	Remedial Hours Cost (\$)	Net Milleau Hours	Milleau Hours Cost ³ (\$)	Total Cost Per Special Child (\$)
2M	322	35.6	548	286.4	859	1407
3M	322	40.6	625	281.4	844	1469
5F	322	31.9	491	290.1	870	1361
7M	322	10.9	168	311.1	933	1101
9F	322	10.4	160	311.6	935	1095
11F	322	11.9	183	310.1	930	1113
Total		141.3	2175	1790.7	5371	7546
Average		23.6	362.5	298.5	895.2	1257.7

Notes:

¹ There were 92 week days in the five month period. A special needs child attends 5 half-days a week (3.5 hours of program time each day). 92 x 3.5 yields 322 hours as the maximum available hours for a special needs child. A regular child attends three half-days in the five month period. 55.2 x 3.5 yields 194.25 hours as the maximum available for a regular child.

The average enrollment over the five treatment months was 29 special needs children and 44 regular children. The total potential child hours, therefore, were as follows:

29 special children: 29 x 322	= 9338 child hours
44 regular children: 44 x 194.25	= 8547 child hours
Total child hours (100%)	17885 child hours

TABLE III-4 (cont'd)

² From special time sheets completed by each early childhood education worker at the centre, individual remedial work hours per child are known over the five month period. The total was 141.3 remedial work hours.

The total input cost at the Centre for the five months was \$55,488. Over 92 days this amounts to \$301.57 per half day or \$86.16 per hour (half-day = 3.5 hours). There were 5.6 full time position equivalents. $\$86.16 \div 5.6 = \$15.39$ as the average position cost per input hour (not salary cost alone).

The individualized remedial work, then, had a cost of \$15.39 per hour. For the 141.3 remedial hours the total cost was \$2175. The average remedial work cost per study child was \$363. The average total cost per study child was \$1258.

³ The cost figures are based upon maximum possible attendance hours and not upon the actual attendance hours for each child. The cost remains the same whether the child is present or not. To estimate milieu cost, first calculate the net number of milieu hours:

Total child hours	17,885.0
Remedial work hours	141.3
Net milieu hours	17,743.7 (or 17,744)

If \$2175 was spent for individualized remedial work with the six study children, the net input expenditure available for milieu activity could be:

Total input cost	\$ 55,488
Remedial work cost	2,175
Net milieu cost	\$ 53,313

A total of 17,444 child hours were available for milieu activity at a cost of \$53,313. $\$53,313 \div 17,744 = \$3.00$ as the average cost per child (regular or special) per milieu hour.

The 44 regular children used 9547 child hours as noted earlier. $9547 \text{ hours} \times \$3.00 = \$28,641$ spent for the 44 regular children. $\$28,641 \div 44 = \$651$ as the average cost for each regular child over the five month period.

For the five month period, then, the average cost for each special child was \$1258 and for each regular child was \$651.

The actual salaries and fringe benefit costs for the period were \$44,693. We can, therefore, estimate a savings of about \$10,483 made possible by the contribution of labor by staff volunteers. The total personnel cost would have been about \$55,175 had not the volunteers been there.

In Table III-5, the cost for each child in relation to outcome is displayed.

Insert Table III-5 here

Following upon Table III-5, the question arises as to how much money might be involved to bring each of the six children up to a normal level of functioning. A major assumption here, of course, would be that the rate of improvement would hold reasonably steady. Such an assumption could only be tested by a longitudinal study for the estimated additional months of remedial work implicit in the estimated total cost figure.

Insert Table III-6 here

Since the use of on-going information system data on cost and outcome, aggregated from single subjects, has been demonstrated here, there has been no sampling or randomized allocation procedure used as would be required for a large, one-shot inferential level evaluative research study. When aggregation of single subject data is the preferred research approach, replication of findings can, for internal validity purposes but not for external validity purposes, substantially take the place of randomized experimental and control group procedures.

This means that the findings for the period November 1, 1981 to March 31, 1982 with these six children for whom complete DISC data were

TABLE III-5

COST AND OUTCOME: SIX SPECIAL NEEDS CHILDREN

Child	Cost (\$)	Improvement in Percentile Standing (IPS)	Cost per IPS Point (\$)
2M	1407	0.00	∞
3M	1469	16.54	89.00
5F	1361	20.66	66.00
7M	1101	14.99	73.00
9F	1095	14.32	76.00
11F	1113	25.08	44.00

TABLE III-6

ESTIMATE OF TOTAL COST TO BRING EACH CHILD
UP TO NORMAL FUNCTIONING LEVEL

Child	Percentile Standing April 1982 ¹	Percentile Points in Deficit	Cost per Percentile Point (\$)	Estimated Total Cost to Normal Functioning (\$)
2M	0.00	75.00	∞	∞
3M	28.04	46.96	89.00	4179.00
5F	20.66	54.34	66.00	3586.00
7M	16.20	58.00	73.00	4234.00
9F	19.17	55.83	76.00	4243.00
11F	26.29	48.71	44.00	2143.00

Notes:

¹ Six skill areas only.

obtained would need to be buttressed by replications with as many special needs children as possible from year to year.

If this were to be done, and if the treatment outcomes and costs for special needs children appeared to be somewhat similar from year to year, voters and taxpayers in the Waterloo Region and elected officials in the Regional Council of the Regional Municipality of Waterloo could begin to face the clear policy question of what priority to give to remedial work with special needs children within the Regional Waterloo population area. The cost for achieving a given amount of improvement would be known within reasonable limits. The only other planning and funding question would be: how many special needs preschoolers are there in the Regional Waterloo population area?

The Chronological Months Gain Option for Outcome Measurement

Reference was made earlier to one alternative approach to outcome measurement using chronological age in months (corresponding to each raw score) as a measure of treatment outcome, instead of improved percentile standing (IPS) as in this demonstration. To explain this option, the DISC Record Sheet is reproduced below. The 27 "items" are each discrete statements of a skill which a child, when tested, either can or cannot do. In general, the chronological age levels in months (on the right) represent the age at which a normal child can be expected to execute the prescribed test skill successfully.

D.I.S.C. Record Sheet

D. I. S. C.

Raw Score

Item #	mo. / yr.
27	58-60 5
26	55-57
25	52-54
24	49-51
23	46-48 4
22	43-45
21	40-42
20	37-39
19	34-36 3
18	31-33
17	28-30
16	25-27
15	23-24 2
14	21-22
13	19-20
12	17-18
11	15-16
10	13-14
9	11-12
8	9-10
7	7-8
6	5-6
5	4
4	3
3	2
2	1
1	5

In Table III-3, child 2M is shown to have been at 0.00 percentual level in October before the five month treatment period, and at the 0.00 percentile level still in April following, thus showing no improvement in percentile standing (IPS). In Table III-3, only the average percentile standing across six developmental areas is shown, and no raw scores for each of the six areas are displayed. We will now present the raw scores for child 2M (somewhat similar to the format for child 7M in Table III-2).

Insert Table III-7 here

Note, then, that child 2M who shows no improvement when percentile standing (PS) is used as a measure of outcome, shows evidence of improvement when chronological months of gain (CMG) is used to measure level of functioning and treatment outcome.

The CMG evidence, however, must be interpreted with two points in mind:

1. Child 2M grew 5 months older during the five month treatment period. With this consideration in mind, child 2M in fine motor skills, for example, could be said to have fallen 2 months behind with only a 3 month gain; the same would be true for visual-attention and memory skills. However, after subtracting 5 months for aging, child 2M could still be seen as having made net chronological months gains of from 1 to 7 months in the other skill areas. His overall average gain in chronological months was 7, or 2 over his 5 for aging.
2. The second limitation in the CMG approach has to do, of course, with the normlessness of the CMG ratings. The importance of the percentile standing (PS) approach may be in its link to standardized norms of skill level; something currently referred to in the literature as "change norms".

TABLE III-7

RAW SCORES AND CHRONOLOGICAL MONTHS OF GAIN
FOR ONE CHILD (2M) IN SIX SKILL AREAS, OCTOBER 1981 AND APRIL 1982

Skill Areas	October 1981 Raw Score	April 1982 Raw Score	Chronological Months of Gain (CMG) ¹
			(median month in each range)
Fine Motor (FM)	23	24	3 months
Receptive Language (RL)	20	22	6 months
Expressive Language (EL)	19	23	12 months
Gross Motor (GM)	16	20	12 months
Auditory-Attention/ Memory	19	20	3 months
Visual-Attention/ Memory	20	22	6 months
Self-Help (SH)	-2	25	-
Social Skills (SS)	-2	25	-
			$\bar{X}$ = 7 months

Notes:

¹ CMG - Chronological Months of Gain

² No October score available due to absence or test refused.

Comparison of client change data to relevant change norms is conceptually the strongest approach to demonstrating program effectiveness. At present, such change norms do not exist for most service programs. In our experience, personnel in regulatory and funding agencies often consider the development of outcome norms to be the obvious next step in human service program evaluation...

(Hargreaves and Attkisson, 1982, 313).³

Until this demonstration, the researchers are not aware of any examples of the use of standardized developmental inventory instruments to obtain a single, overall rating of progress or change in treatment. For this reason, this field exploration of possibilities and problems in doing so has special utility, despite the extra hours of consultation and reflection required by all parties directly involved in this particular field demonstration.

In closing, note that professional colleagues closely involved with the Hespeler Preschool Education Centre and its operation are aware of other factors, such as family functioning in the child's home and the depth of deficit in certain crucial developmental areas. Such factors may explain why one child progresses more or less than another. Special file studies of children with certain kinds of deficit or certain home situations could be useful in this regard. New approaches to remedial work may arise which can be tried. Comparative cost-outcome findings can be examined for different approaches with children for whom family factors or special deficit conditions exist. Time has not permitted further

³ From William A. Hargreaves and Clifford C. Attkisson, "Evaluating Program Outcomes," in C. Clifford Attkisson, William A. Hargreaves, and Mardi J. Horowitz (eds.), Evaluation of Human Service Programs (New York: Academic Press, 1978).

examination of such questions in this demonstration. The purpose here has been to explore the problems and possibilities for installing and using cost-outcome procedures as an extension of the Centre's present financial and program accounting system.

If the Day Care Division of the Department of Social Services of the Regional Municipality of Waterloo were to choose to integrate an annual cost-outcome analysis for each and all special needs children at the Hespeler Pre-School Education Centre on the format demonstrated here, just four additional steps beyond what is already being done would seem to be required: (1) the Daily Worker Activity and Time Report Sheet used by Hespeler Centre teachers in the demonstration to record remedial work time spent with each special needs child each morning and each afternoon would have to be made a permanent procedure at the Centre, (2) the Regional Government Department of Social Services would have to receive these sheets each month and store the data in a computerized data base, (3) the Finance Department of Regional Government would have to prepare Table III-5 each year end, and (4) the Day Care Unit would have to prepare Table III-4 using DISC outcome data available in each child's file at the Centre; the Hespeler Centre supervisor would probably be given a one-page form on which to report this information to the Day Care Unit.

AUSABLE SPRINGS, INC.
(Group Home)

Ausable Springs, Inc. is a network of 14 Group Homes at various locations in Ontario. With about 6 beds at each site, some 84 beds in all are involved. This agency is incorporated as a non-profit organization. It has a self-perpetuating Board of Directors of 4 members. The time frame for data collection was set at September through December 1981.

Sixteen cases were studied. Four were closed during the three month time frame and twelve remained open cases. The outcome rating on all sixteen cases was done as of December 31, 1981. With respect to cost, the average was taken of per diem cost for October 1981 (\$46.10) and November 1981 (\$51.24) yielding a mean of \$48.67.

With respect to treatment outcome measurement, the agency was already using a Progress Report form which called for the identification of up to three presenting problems, three short-term goals, and three long-term goals. However, no outcome rating scale sheet was being used and so was added for the purpose of the feasibility demonstration. Thus, in this situation a subjective goal oriented scale was employed. With reference to each related short-term goal statement, the outcome choices used were (1) goal not met, (2) goal partly met, (3) goal largely met, (4) goal met, (5) goal exceeded.

For data analysis, the first step was to prepare a classified list of the short-term goal statements. The long-term goal statements were not used in our analysis because by their nature no judgement could be made until some time after the young person had left the Group Home. In Table IV-1, nineteen short-term goal statements are detailed as taken from the progress record forms used by this agency.

Insert Table IV-1 here

The next step was to use the date of admission and the date of discharge or December 31, 1981, to derive the number of days of care for each of the sixteen cases. Table IV-2 calculates the cost for each case.

TABLE IV-1

SHORT TERM GOAL STATEMENTS FOR SIXTEEN GROUP HOME YOUTH

Goal Statement	Frequency of Statement	Percentage of Youth with Same Goal
1. To learn to relate appropriately to authority figures	3	18.8
2. To integrate successfully into school programs	9	56.3
3. To attend school regularly	3	18.8
4. To improve personal hygiene	2	12.5
5. To improve self-esteem	1	6.3
6. To deal with issues, not run away	2	12.5
7. To stop stealing and lying	1	6.3
8. To express self verbally, appropriately	1	6.3
9. To spend time playing with other boys	1	6.3
10. To enjoy visit with older brother	1	6.3
11. To develop a more positive relationship with peers	5	31.3
12. To develop positive ways of getting attention	3	18.8
13. To become accountable for his attitudes and behavior	3	18.8
14. To deal with feelings about separation from mother	1	6.3
15. Eliminate the problem of enuresis	1	6.3
16. To develop better impulse control	2	12.5
17. To tell other person directly when he is angry	2	12.5
18. To say good things to and about others	1	6.3
19. To stop bullying other children	1	6.3

Insert Table IV-2 here

In Table IV-2, the outcome score for each case was summed from the progress report form for each young person, with the rated outcome sheet attached. In case #1, for example, there were just two goal statements and if Goal Met is 3, the maximum possible summated score would have been 6. However, the actual summated score was 1, or 16.6%.

Finally, the cost-outcome analysis can be calculated as in Table IV-3. Each of the sixteen cases is reported at one of five levels of success, based on its PGM score. The relevant costs for each level of success are portrayed in Table IV-3, as well.

Insert Table IV-3 here

For internal management and program development purposes, Table IV-3 information could be used to review the highest cost and lower results cases systematically to seek some further diagnostic understanding of those cases and consider what alternatives for treatment might be tried with similar cases next time. This kind of feedback can be an alert and a guide to innovation.

For external funding body purposes, the following utility areas can be identified:

- (a) To have a bench mark from which to compare the agency's performance from year to year.
- (b) To follow intelligently those changes in the agency's service plan which may appear from year to year.

TABLE IV-2
SUMMATED OUTCOME SCORES AND COSTS

Case Number	Maximum Possible Goal Met Summated Score ²	Summated Score (SS) ¹	Percentage of Maximum Goal Achieved ³	Days Care	Total Cost (\$)	Cost per Unit Change in SS (\$)
1	6	1	16.6	126	6,132	6,132
2	9	3	33.3	72	3,504	1,168
3	9	5	55.6	65	3,163	633
4	9	0	00.0	124	6,035	∞
5	9	4	44.4	121	5,889	1,492
6	6	5	83.3	184	8,955	1,791
7	9	5	55.6	246	11,973	2,395
8	9	5	33.3	126	6,132	1,226
9	6	2	33.3	414	20,149	10,075
10	9	3	33.3	374	18,203	6,068
11	9	3	33.3	364	17,716	5,905
12	9	3	33.3	332	16,158	5,386
13	9	6	66.6	52	2,531	422
14	9	4	44.4	199	9,685	2,421
15	9	8	88.8	101	4,916	615
16	9	2	22.2	184	8,955	4,478
Total	135	59	677.3	3084	150,096	
Average	8.4	3.7	44.0	192.8	9,381	2,544

Notes:

1 Goal not met: 0; Goal partly met: 1; Goal largely met: 2; Goal met: 3; Goal exceeded: 4.

2 Multiply number of goal statements times goal met value of 3.

3 Percentage of Maximum Goal Achieved from hereon is listed As PGM.

- (c) To develop reasonably accurate information about each Group Home's clientele, especially the nature of the presenting problems and perhaps the severity of the problems reflected in the lives of the young people accepted for admission. An examination of the "will not accept children with the Following Conditions, Problems, or Behaviour Patterns" lists published by various Group Home operators suggests that there is considerable divergence among them on this point. The Ausable Springs, Ind. documents list relatively few "will not accept" conditions, which may indeed be reflected in the Cost-Outcome Summary picture above.

But note here that cost outcome data such as these do not in themselves answer such questions as "How severe were the problems these youngsters brought?" or "Is there some quite different treatment approach which should be tried with certain kinds of cases?" or "Are we getting as good a result as can be expected, given the kinds of problems presented and the present state of our knowledge around these problems?"

At the very least, such cost-outcome information may motivate everyone, frontline workers, supervisors, manager, board, and funder to face the prime question "Should we be satisfied with the results we are getting, or should we innovate?"

Clearly also, the nature of the short-term goal selected for outcome measurement will influence outcome success rates. However, there are safeguards against the possibility of too-easy goal statements; such safeguards can include (1) the professional integrity of staff members, (2) the use of a small internal audit committee of staff members or staff and board members to evaluate the quality of the goal statements once a year, and (3) the inclusion of a list of the goal statements in use along with other supporting documents for the proposed service plan submitted

annually for funding approval to a governmental planning and allocating body, Ministry area manager, or the United Way.

Perhaps it is easy to comprehend from this example how important an objective scale taking into account presenting problems and improvements would be in achieving long-term cost-outcome measures with significant meaning which were not subject to incentives to scaling in an unethical manner. Moreover, given the number of group homes in the province, perhaps an operations audit on a regular basis might be appropriate.

Gains while in the Group Home can be lost if things at home when the young person returns home are just as they were before. A youngster's progress while in the Group Home might be materially accelerated by effective concurrent work with the family at home. The crucial problems indeed, may really be in the marriage relationship of parents, family income level or expectations for the children. But questions such as these, while they are not answered by cost-outcome data, may be stimulated by such information, hence advancing focussed innovation, including perhaps more attention to the less costly preventive programs provided by sectarian and non-sectarian agencies in society and here the role for non-profit agencies is wide open.

GUELPH AND WELLINGTON COUNTY CHILDREN'S AID SOCIETY

Each Children's Aid Society (CAS) has three main divisions: (1) a Protection Division to work with family problems--parents, children and teenagers--without removing a child or young person from his own home,

(2) a Family Counselling Division, and (3) a Children's Services Division involving the placement of children in foster homes or institutions while seeking to prepare parents and children to re-unite, along with an adoption service. The Guelph C.A.S. is similar but has also developed several innovative sub-programs for teenagers--whether in their own homes or in foster homes or group care.

It was originally decided to gather worker treatment time data and treatment outcome data on no more than 25 Family Service Department (family counselling) cases including perhaps 5 cases in which teenagers are taken into care (removed from their own homes.)

A Daily Worker Activity Report Sheet was developed collaboratively to capture direct treatment time by case number, travel time, and case-related time such as internal case conferences, supervision time and external consultation time. A code sheet was prepared to facilitate the use of the daily worker time sheet. Workers were asked to complete the time sheets only for designated project cases.

In order to obtain scaled worker judgements on treatment outcome, a Treatment Outcome Rating Form was devised of a subjective problem oriented scale nature. This form was retained in each Family Service Department project case file. This form required the primary worker, alone or in conference with other workers having treatment contacts with the child or family, to identify from two to six major problem areas in family functioning and/or the child's functioning. When the case was accepted for service, a "before" rating was recorded as to the severity of the problem on a four-point scale: severe -1, moderate -2, light -3, or resolved -4.

The six project cases reported here were accepted for service about October 1, 1981. As of December 18, 1981, the primary worker was asked to rate each of the six cases again, using the same four-point problem severity scale. None of the six project cases had been closed by December 18. The cost-outcome analysis was done for this three month period to exercise the forms and procedures and to relate direct treatment cost per case to whatever progress might be evident after the three month period. Since no inferential level research was contemplated, the aggregation of data for six single subjects was seen as quite sufficient for a feasibility demonstration.

Since the number of identified problems on each of the six treatment Outcome Rating Forms could vary from one to six, a straightforward formula was used to obtain a problem severity score (PSS) for each case - at the time of admission and on or about December 18, 1981. The formula was as follows:

$$\text{Problem Severity Score} = \frac{\text{Summed Score}}{\text{Number of Problems times 4}}$$

The worker treatment time data (in hours) were given to a financial officer of the agency who calculated cost on an individual named worker basis (hourly rate). This required about thirty minutes of the financial officer's time.

In Table V-1, only treatment related worker time is used to reflect cost. However, all workers with treatment related involvements are reflected in this cost. The percentage of each worker's time deployed in treatment related activity, as distinct from internal agency meetings and assignments on the one hand or community involvements on the other is unknown. However, a minor addition to the Daily Worker Activity Report

Sheet could capture this additional information, on a regular or periodic basis. A pro-rated fair share of overall administrative cost is not reflected in this particular cost-outcome analysis.

Table V-1 rank orders six cases from highest to lowest change score. Even from this preliminary exercise, it is encouraging to see the correspondence between direct case cost (treatment time) and level of success. Replications, perhaps every three months, for all cases in an agency such as this would begin to lend considerable credibility to such data if the pattern was similar over a longer period of time on new cases.

Insert Table V-1 here

In addition to the summarized findings in Table V-1, an individual case by case analysis was prepared to detail the number of workers active in each case, the time invested by each worker, and the cumulative travel time for each case over the period each case was active.

It is, of course, apparent that feed-back of this kind to each front line worker, supervisors, and manager could be used to examine various aspects of performance and productivity, as well as of cost and outcome.

Finally, a summation of the problems identified on the six Treatment Outcome Rating Forms was prepared. This summary classified 15 parent functioning problems and 7 child or youth functioning problems. At the Guelph CAS staff meeting on January 12, 1982, at which these demonstration findings were shared and discussed, front line workers and supervisors were quick to note several issues for possible staff study around the nature and implications for goal setting and treatment planning from such information.

TABLE V-1

COST-OUTCOME ANALYSIS
(for period September 23 to December 18, 1981)

Case	Total Case Related Hours	Direct Case Cost (\$)	Change Score ¹	Cost per Unit Change (\$)
R-27	38.5	586.47	25	23.5
R-12	48.0	483.30	25	19.3
R-14	5.0	78.80	19	4.1
R- 6	6.5	93.59	18	5.2
R-24	4.0	57.27	17	3.4
R- 3	2.0	28.63	00	∞
Total	104	1328.06	104	
Average	17.3	221.34	17.3	12.8

¹ May be interpreted as percentage of change toward all problems resolved.

In Table V-2, a recapitulation of the parent and child functioning problems is provided for ready examination, along with the worker rated problem severity at intake. The necessarily subjective nature of any subjective problem oriented scale is further illustrated in examining the Table V-2 material. Such a scale, by its nature, offers low reliability as a data gathering instrument and low validity with respect to the data gathered. Nevertheless, it is less subjective and more precise than global intuitive estimates from narrative recording alone.

Insert Table V-2 here

SAINT LUKE'S PLACE
(Charitable Home for the Aged)

Saint Luke's Place is a senior citizens complex consisting of an elderly persons centre, residential care unit, an extended care unit, and apartments. The complex is sponsored by an adjacent local church. The congregation elects a Board of Directors for Saint Luke's Place of 14 persons, 7 of whom are members of the local church and 7 additional persons from various religious and occupational backgrounds in the community. The operating budget in fiscal 1980 was \$834,352.00. The facility features a continuum of care from fully mobile residents in the day centre program and apartments, to the residential care unit providing some nursing service and special care, to the extended care unit for residents requiring considerable care.

TABLE V-2

IDENTIFIED PROBLEMS

Parent Functioning Problems	<u>Case No.</u>	<u>Problem Severity¹</u> (at intake)
1. Parent rejection of child	R-3	S
2. Possible sexual molestation of child	R-6	L
3. Poor communication between husband and wife - possible violence	R-6	S
4. Unemployment and financial pressures	R-6	M
5. Communication problem between caretaker (sister) and child	R-14	M
6. Mother's inability to care (psychologically)	R-14	S
7. Overinvolvement of extended family	R-14	M
8. Possible abuse of son	R-24	L
9. Maternal rejection of child	R-24	S
10. Father's lack of involvement with child	R-24	S
11. Poor communication between parents	R-24	M
12. Mom's depression	R-24	M
13. Father's indifference to son: violence in home	R-27	M
14. Communication between parents	R-27	M
15. Mother having difficulty controlling son's behavior	R-12	(not rated)
Child/Youth Functioning Problems		
1. Individual needs of child; emotional and financial	R-3	M
2. Provocativeness of child: acting out behavior	R-6	M
3. Provocative child - adopted	R-14	S
4. Child's read hipeak social and emotional	R-24	M
5. Poor school attendance	R-27	S
6. Poor self-esteem-possible depression	R-27	S
7. Difficulties with the law-on probation for B/E and theft	R-12	M

Notes:

¹ S indicates severe; M, medium; and L, low.

Conceptually, architectually, and program-wise, it illustrates an advanced model of care and service for elderly people. The life autonomy of residents is conserved and advanced in many ways and the maximization of such autonomy is a cherished goal. The elderly persons centre, of course, is open to any and all seniors in the community and includes a swimming pool, woodworking shop, barber shop, beauty salon, ceramics, pottery, oil painting, quilting, discussion groups, trips, and recreation activities.

The focus of our feasibility demonstration in cost-outcome analysis has been on the extended care unit. Begun in 1980, this unit currently had about 30 residents, most of whom were coming from the residential care unit as age related factors led to more intensive care requirements. But friends within Saint Luke's and the community are still available, there are the same staff members, and family ties are uninterrupted; thus the precious continuity of these relationships is maintained.

For the cost-outcome demonstration, 23 residents in the extended care unit in the time frame, October through December 1981, were studied.

The Registered Nurse responsible for the supervision of the extended care unit maintains a problem and goal oriented note record sheet for each resident, in consultation with nursing and other personnel in regular touch with the resident. This recording summary sheet calls for a listing of special problems, a goal statement for each problem, a treatment plan statement, and a note about the resident's response to the treatment activity on each problem. Such a chart, of course, facilitates cooperation among various professional and paraprofessional employees on behalf of maximized problem reduction and conservation of resident autonomy.

However, an extended care unit illustrates a tertiary prevention situation which is very different from a primary prevention or secondary prevention situation. In tertiary or chronic care, certain biological or psychological, social or emotional disabilities are at a point where very little or no "cure" is possible. The goal in tertiary care has to be to minimize further deterioration and to minimize the effects of the disability on other aspects of the residents' life and functioning.

It may be of interest, first of all, to examine the kinds of problems and disabilities which had been recorded for our 23 residents in the time frame from October through December 1981. Table VI-1 following reports these problems among the 23 residents, and the percentage of the 23 residents suffering from each problem.

Insert Table VI-1 here

In order to rate the Registered Nurse's judgements on treatment outcome (her notes on "Resident's Response" for each identified problem), the following scale was established:

I Improved	5	(weighting)	High Success
ND No Deterioration	4	"	High Success
LD Little Deterioration	3	"	Medium Success
SD Some Deterioration	2	"	Medium Success
MD Much Deterioration	1	"	Low Success

While the possibility of "Improved" is provided for on those particular problems where some improvement in functioning may be possible, the prevention of further deterioration is also weighed high since tertiary care by definition is given to this general goal.

TABLE VI-1
PROBLEMS OF TWENTY THREE EXTENDED CARE RESIDENTS

Problem	Frequency	n = 46 problems	
		Percentage of all Frequencies	Percentage of Residents
1. Inability to perform ADL due to loss of mental functions	14	11.9	60.9
2. Difficulty in walking due to pain in buttock	1	0.9	4.3
3. Loss of self-esteem and positive body image	2	1.6	8.8
4. Depression	4	3.4	17.4
5. Tries to manipulate staff and residents to do things for her	2	1.6	8.8
6. Overweight	2	1.6	8.8
7. Loud and unbearing manner	1	0.9	4.3
8. Constipation	7	5.9	30.4
9. Incontinent of urine and/or stool	9	7.6	39.1
10. Belligerent toward staff	1	0.9	4.3
11. Falls frequently	1	0.9	4.3
12. Frustration and anxiety of loss of independence	5	4.2	21.8
13. Inability to keep muscles toned	3	2.5	13.0
14. Spasms of legs	2	1.6	8.8
15. U.T.I. due to lack of bladder control	2	1.6	8.8
16. Tends to have B.M. in the sink rather than in the toilet	1	0.9	4.3
17. Unaware of time and place	4	3.4	17.4
18. Infected foot	3	2.5	13.0
19. Unable to cut own food or prepare his own snacks	1	0.9	4.3
20. Decreased sensation to temperature on tongue (CUA)	1	0.9	4.3
21. Blind in one eye (CUA) - loss of vision	5	4.2	21.8
22. Contracture of arm and hand (CUA)	3	2.5	13.0
23. Difficulty swallowing due to lack of neuromuscular control	1	0.9	4.3
24. Underweight	2	1.6	8.8
25. Skin Breakdown	12	10.2	52.2
26. Periods of agitation due to inability to communicate	2	1.6	8.8
27. Isolation - rejection of other patients and their rejection to her	3	2.5	13.0
28. Speech problem	1	0.9	4.3
29. Inactivity	2	1.6	8.8
30. Unwilling to stay in dining room if food not served immediately	1	0.9	4.3
31. Difficulty walking due to paralysis	2	1.6	8.8
32. Difficulty eating due to tremors	1	0.9	4.3
33. Swelling of leg (phlebitis)	1	0.9	4.3
34. Edema both legs due to immobility	1	0.9	4.3
35. Frequent eye infections due to putting fingers in her eyes	1	0.9	4.3
36. Urinary dribbling (and odour) due to benign prostatic hypertrophy	1	0.9	4.3
37. Hearing problem	4	3.4	17.4
38. Abdominal pain due to bleeding uterus	1	0.9	4.3
39. Potential pneumonia due to immobility	1	0.9	4.3
40. Painful stoma due to colostomy stricture	1	0.9	4.3
41. Spasticity due to paralysis	2	1.6	8.8
42. Difficulty walking due to inflamed joints	1	0.9	4.3
43. Unable to perform total ADL	1	0.9	4.3
44. Unwillingness to go for a shower	1	0.9	4.3
45. Shortness of breath	1	0.8	4.3
46. Difficulty sleeping	1	0.8	4.3

In Table VI-2, the problems are subset as biological problems or social, emotional, interpersonal problems, and are then scaled. In case #1, for example, a total of three problems had been identified. If all three could be rated as "Improved", a summed score of 15 would be earned since "Improved" has a weighting of 5. If, as in case #3, five problems had been identified, the maximum possible summed score would be 25. The percentage of maximum functioning percentage (FMF) then is simply the percentage of maximum score actually achieved.

Insert Table VI-2 here

A FMF in Table VI-2 of from 80-100 is arbitrarily equated with High Success, 40-79 with Medium Success, and 20-39 with Low Success.

Table VI-3 relates cost to outcome. The average partial per diem cost at Saint Luke's Place for the extended care program over the three months October to December 1981 was \$32.01. There were 92 days care in those three months. The total cost for 23 residents over those three months was \$65,617.16.

Since in congregate care it is difficult and probably impossible to get worker time data by case (as in the Guelph Children's Aid Society demonstration, or in part in the Vocational Rehabilitation demonstration, and in part in the Hespeler Preschool Education Centre demonstration), differential costs for individual residents cannot be related to their individual treatment outcomes. We have only average per diem cost for each of the 23 residents as a group. This was true in the Lutherwood demonstration as well.

In Table VI-3, a format is used which for all 23 residents as a group still gives a picture of results in relation to cost. It is still

TABLE VI-2

PERCENTAGE OF MAXIMUM FUNCTIONING (PMF) SCORES
ON OUTCOME FOR EXTENDED CARE RESIDENTS

Case	Biological Problems	Social Emotional Interpersonal Problems	Total Problems	Scaled Outcomes ¹					Summed Score		PMF
									Actual	Potential	
1	2	1	3	5	4			1	10	15	66.6
2	0	2	2		8				8	10	80.0
3	5	3	8	15	20				35	40	87.5
4	4	1	5		20				20	25	80.0
5	5	0	5	5	16				21	25	84.0
6	7	0	7	20	8	3			31	35	88.6
7	6	1	7	15	16				31	35	88.6
8	3	3	6		24				24	30	80.0
9	3	2	5	5	16				21	25	84.0
10	4	0	4	5	12				17	20	85.0
11	1	2	3		12				12	15	80.0
12	2	1	3	10	4				14	15	93.3
13	6	0	6		24				24	30	80.0
14	4	1	5	5	16				21	25	84.0
15	4	1	5	15	8				23	25	92.0
16	6	0	6	20	4		2		26	30	86.7
17	9	1	10	15	24		2		41	50	82.0
18	3	2	5	5	12		2		19	25	76.0
19	4	1	5	10	12				22	25	88.0
20	6	0	6	15	12				27	30	90.0
21	3	1	4		12	3			15	20	75.0
22	4	1	5	15	8				23	25	92.0
23	3	1	4	10	8				18	20	90.0
	94	25	119								

possible at Saint Luke's Place to use the Table VI-2 - Percentage of Maximum Function (PMF) Scores on Outcome for Extended Care Residents information to identify individuals with lower success on outcome and give special single subject attention and study to those cases.

Insert Table VI-3 here

Here, a subjective problem oriented scale has been used to rate treatment outcome for 23 extended care residents. The possibility of using a subjective goal oriented scale was considered but it was found that the notes on goal statements tended to be too optimistic for a tertiary care situation. The goal notes along with the resident response notes were useful in making a judgement about changes in functioning around the initial problem.

When the rater gets ready to scale a judgement about treatment outcome, using a subjective problem oriented scale, his or her eye is on the problem statement as a generalized statement. Nevertheless, if a nurse, a relative, a friend and even the resident as well were invited to rate "Improved" or "No Deterioration" on a problem such as incontinence or skin breakdown, there is apt to be pretty good agreement (instrument reliability) and all parties will know what is being talked about (data validity), even without measurement data of a more empirical nature. This would perhaps be true of some problems more than others, but the utility of cost-outcome information as presented here for both internal management and front line treatment feedback and for an external funding body may be sufficient to serve the purpose.

TABLE VI-3

COST-OUTCOME ANALYSIS: SAINT LUKE'S PLACE

Success Level	Percentage	Expenditures ¹ (\$)
High Success	87%	57,086.93
Medium Success	13%	8,530.23
Low Success	0%	-----
		65,617.16

¹ Expenditures calculated at \$32.01 average partial per diem for 92 days for 23 patients.

If an in-depth inferential level study of the program were being undertaken, greater measurement precision on the problems (on level of functioning as the dependent variable) would be essential. But for on-going information system generated data base analysis of cost and outcome and special studies or single subject experiments on selected problems to find improved treatment possibilities, this feasibility demonstration may be sufficient.

CONCLUSION

Recall again that cost-outcome analysis is a summative research product which can provide the kind of feedback to management, frontline workers, board and funding bodies which can give reassurance on the one hand or an alert to various parties for a fuller program evaluation effort relating various structural and process variables (organization and treatment) to present treatment outcome and cost factors. Cost-outcome information is not a substitute for inferential level program evaluation work when uncertainty exists as to how present costs and outcomes might be improved. However, good program evaluation work must eventually relate process variables (staff qualifications, differential use of personnel, program structure, procedures, treatment modalities, operations efficiency, etc.) to cost and treatment outcome.

It is quite clear that in all six settings it was possible to derive a measure of cost-outcome on a single-case basis. However, it is also clear that there are problems to be encountered before measures of cost-outcome can be successfully used to induce a greater accountability and lead to more efficiency in the social service sphere.

The technology is generally available to derive costs although standard line-item budgeting proves insufficient to help significantly. It is important to account for costs on a program basis, including overhead, salaries, and advertising and also to account for case-by-case direct costs. A common complaint is that the benefits of time sheet analysis and the costs involved in such accounting exceed the benefits and that may well be the situation when there is no reason for this data. On the other hand, should the Ministry and/or agency officials determine that the allocation of resources to the services that have the highest benefit potential is crucial, then collecting cost data will no longer be irrelevant. The rapid pace of computer usage and the relatively low cost now make it possible for a caseworker to punch in a few numbers on a desk console which would make the accounting system quite accurate as well as low cost.

The biggest stumbling block in cost-outcome analysis is the relative lack of objective measures of outcome. It is important that incoming clients be evaluated on an objective scale and that periodically the evaluation be repeated, both to determine the relative progress and to control the agencies expenditures. Thus low-cost evaluation procedures must be adopted. Moreover, these procedures must be subject to replication and outside audit.

In this study, the six locations provided a variety of outcome measures. Thus diversity of possible measures can be seen as a problem in moving towards cost effectiveness analysis. For instance, the Hespeler Day Care Centre was the only agency using an objective scale that related the client to a norm which could be given at the beginning and the con-

clusion of treatment. Within given service fields, province-wide, it may be possible to move toward one uniform measure. Between service areas, however, the measures may need to differ.

Finally, it is not clear that any of the agencies dealt with were solely responsible for the progress being made. Just as in education, the pupil, his family, and peer group, and various other external forces will affect the amount of retained information, the agencies will find their work with a client is affected by external factors such as family, living arrangements, or in a residential setting by visitors, etc. There has been no attempt in the studies conducted here to control for these external factors or even to enumerate them. There is a need to work further on this aspect, if cost-outcome analysis is going to become one feature of financial agreements between the government and an agency. In addition to careful use of the AB (baseline followed by intervention) design in single subject charting, a randomized group design will sometimes be feasible.

Social planners must also help define desirable outcomes. For instance, the Vocational Rehabilitation clients who were trained to become housewives or househusbands may add to GNP if they make it possible for the spouse to become a productive factor input. They are also adding to the welfare of themselves and their immediate families by what they do in the household but that is a part of the standard of living which is not included in GNP. The question arises then as to how to define success. In the Vocational Rehabilitation demonstration, housewives were eliminated from analysis but that may not be ideal in the longer run. Decisions

about appropriate success measures should be made in a political context without reference to the scarce resources available for social services.

There has been no intention in any of the six studies reported on here to attempt a comparison between programs or modalities. For instance, the Lutherwood Day Care Program cannot legitimately be compared to the Cottage Program in the absence of objective problem severity measurement both at admission and at closure. Both programs are reported here more as an illustration of the methodology involved and the feasibility of cost-outcome analysis.

These six demonstrations can only bring the reader to conclude that cost-outcome analysis is indeed possible. It is feasible to do cost-outcome analysis and will become feasible to do cost-effectiveness studies if the internal agency information gathering system is carefully developed so as to yield the needed data on cost and outcome. Clearly, there is always the hazard of measuring the wrong thing or using proxies for cost or outcome which are inappropriate. However, there are benefits to be derived in the social service sector developing cost-outcome measures that are appropriate. Good progress is being made in both economics and social work which can help both administrators and funders find and use the appropriate measures.

APPENDICES

Lutherwood

RR#3 • Waterloo, Ontario N2J 3Z4 • (519) 884-1470

February 23, 1983

Dr. Sheldon Rahn
Associate Professor of Social Work
Wilfrid Laurier University
Waterloo, Ontario
N2L 3C5

Dear Sheldon:

After having read the chapter on the cost-outcome feasibility demonstrations as it applies to Lutherwood, I am very intrigued and even impressed with its potential usefulness to an agency. As our schedules permit, I would be most interested in discussing these matters further with you, especially the differences between the Sorenson-Grove Cost Effectiveness Matrix and the dichotomized outcome scale.

As you may know, the Ministry of Community and Social Services is currently designing a rather comprehensive information system that will attempt to get fairly specific information from an agency around things like worker activities, client profiles, length of stay, cost, etc. They will attempt, on this basis, to make inter-agency comparisons, ultimately, I'm sure, for funding purposes.

The one area that they currently have not dealt with officially is that of outcome or effective indicators. My feeling is that in order for the Ministry to know whether dollars are being spent effectively, this information is essential. Only then can relevant comparisons be made.

BOARD OF GOVERNORS THE REV. JAMES H. BLOCH ST. CATHARINES • WENNER BROOKBERG KITCHENER • GARY BYRD MILVERTON • HAROLD A. DILTRICH CHAIRMAN WATERLOO • CLYDE KNOLL ST. CATHARINES • MRS. JEAN A. O'LEARY SECRETARY KITCHENER • JOHN MAHN WATERLOO • DAN MARSHALL KITCHENER • MRS. GRACE MCGREGOR NEW HAMBURG • FRANK MONTZ VICE CHAIRMAN WATERLOO • THE REV. ROBERTS MORLEY TILSONBURG • CARL H. SCHMIDT WATERLOO • WILLIAM K. HOWARD TREASURER CAMBRIDGE • CLIFFORD C. WILKE KITCHENER • COUNSEL RICHARD G. McLENNAN QC • STAFF THE REV. DILLIEN KAYS DIRECTOR

On first glance, your paper seems to provide us with an answer for making those comparisons. However, it must be realized, taking our system as an example, unless the goals and the method of collecting data can be standardized across agencies, our ability or government's ability to make meaningful inter-agency comparisons is impossible. Intra-agency comparisons seem to be more meaningful while again having some limitations.

I thought I would pass these thoughts on since it may be useful to you and others who might read your report. Again, thank you for allowing us to play a part in this study. It was a pleasure to work with you, as always, and I trust the study was a success by your standards.

Kindest regards,

A handwritten signature in dark ink, appearing to read "D. E. Kays", with a horizontal line drawn underneath it.

Rev. Dieter E. Kays
Executive Director

DEK:pb



Ministry of
Community and
Social Services

Vocational Rehabilitation Services
75 King Street South
Suite 501, 5th Floor
Waterloo Square
Waterloo, Ontario
N2J 1P2

886-4700

June 9, 1982

Sheldon Rahn, D.S.W.
Faculty of Social Work
Wilfred Laurier University
Waterloo, Ontario

Dear Sheldon:

Enclosed is the draft V.R. cost outcome report with corrections in the narrative inserted.

We agree that one of the short comings of the cost analysis was the reliance on average time and cost figures.

For our purposes at this time we are probably only interested in knowing the combined costs of purchased services and our operating costs per client closed, rather than the final breakdown of time allocations by direct service, RR-RD and administration.

As you indicated if cost data in relation to outcome could be retrieved over time, we would have more reliable data to assess and predict costs.

We hope in the not too distant future we will have the benefit from an onsite microcomputer to make this data readily available to us for these purposes.

Sincerely,

A handwritten signature in cursive script, appearing to read "Annette Twist".

Annette Twist
VRS Supervisor/Specialist
Waterloo Area

AT/sch

Encl.

cc: M. Stephenson

The Children's Aid Society

of the City of Guelph
and the County of Wellington

A. MACRAE — Executive Director

55 DELHI STREET, BOX 1088, GUELPH, ONTARIO, N1H 6N3 • PHONE (519) 824-2410

GROVES MEMORIAL HOSPITAL, 235 UNION STREET E., FERGUS, ONTARIO • PHONE (519) 843-2010

ARTHUR PUBLIC SCHOOL, JOHN STREET, ARTHUR, ONTARIO • PHONE (519) 849-2421

242 MAIN STREET, PALMERSTON, ONTARIO • PHONE (519) 343-3820 (1 00 p.m. - 5 00 p.m.)

LOUISE MARSHALL HOSPITAL, 630 DUBLIN STREET, MOUNT FOREST, ONTARIO • PHONE (519) 323-2210

7 June, 1982

Dr. Sheldon Rahn,
Wilfrid Laurier University,
WATERLOO, Ontario, N2L 3C5

Dear Dr. Rahn:

I am happy to have an opportunity to comment on the problems and possibilities of cost-outcome analysis - based on the demonstration carried out in this Agency.

You are aware from staff input what problems were experienced in implementing this demonstration. I am referring to such things as the fact that the staff found it difficult to incorporate the new recording format into their routines; there was difficulty in completing the treatment outcome rating form because client problems changed from month to month; thus when earlier problems were resolved, new ones developed; thus analysis could only be successfully completed for six cases and conclusive comments could not be made. It appears also that staff felt overwhelmed with the extra paperwork over and above what was routinely required of them. What was needed was a system of recording that substituted for or meshed with existing recording routines to enable workers the time to be thorough.

Having said all that, there is no doubt in my mind that a tool like this would be useful in analysing worker effort and effectiveness as well as in budgeting. Replication would demonstrate how valid this result is.

As well, despite vigorous efforts on the part of the staff member assigned as project liaison, there were deficiencies in worker performance during the project. It was clear that commitment to the use of this tool needed to be weighed at this time against other imminent additional requirements about to be made of workers.

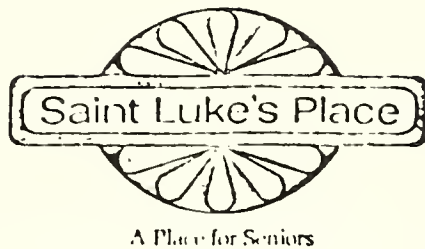
I should add that as a result of this demonstration, senior staff are interested in study cost-outcome effectiveness with respect to the child abuse program. We would welcome the opportunity to discuss with you the design of such a study.

I hope these comments are suitable for your purposes.

Yours sincerely,

Alex Macrae
J. Alex Macrae,
Executive Director.

JAM/EMF/jef



May 13, 1982

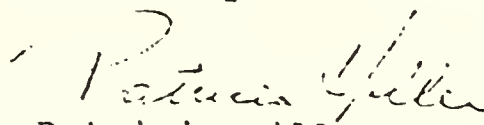
Sheldon Rahn, D.S.W.
Faculty of Social Work
Wilfrid Laurier University
Waterloo, Ontario
N2L 3C5

Dear Professor Rahn:

We recognize the limitations and restrictions of comparing the results of this study to other facilities due to the subjective and imprecise nature of assessing goals and outcome. However this project is a strong beginning in establishing future directions needed in cost-outcome analysis for Saint Luke's Place.

We enjoyed participating in the study and we thank you for the opportunity.

Sincerely


Patricia Hiller

PH/jd

Ausable Springs Inc.

182 Queen Street West,
Brampton, Ontario
L6X 1A8
Telephone: (416) 451-2500

April 23, 1982

Mr. Sheldon Rahn DSW
Faculty of Social Work,
Wilfred Laurier University,
75 University Avenue W.,
Waterloo Ontario

Reference: Cost-Outcome Analysis of Ausable Springs Ranch
Group Homes

Dear Sheldon:-

I am writing to give you some feedback about the recent cost-outcome analysis study which you recently completed and shared with us.

In going through the study, we found the information quite enlightening. Seeing our short-term goal statements listed for the 16 children studied indicated to us a need to assess our method of setting goals for the children in our program. However, in the short term goals listed, some were drawn up with a child, some suggested by the child, and some were drawn up without the child's involvement. The goals suggested by the child may not necessarily have been of top priority to the adults involved. Our feeling is that for an evaluative program to be effective, the goals set would need some criteria to ensure uniformity.

The cost-outcome summary draws our attention to the fact that, using the studies criteria, relatively few children meet or exceed the goals that were set for them at the time of placement. We then must ask the question "are we satisfied with the results, or do we need to take steps that could improve these percentages?" We agree with the statement in the study that there is no consideration given to the severity of disturbance in the child at the time of placement. We believe this factor, if taken into consideration, would show up significantly in the results.

An additional variable in the study which would be very interesting to include, is whether or not our treatment team is directly involved in working with the natural family of the child. Our belief is, that a child does much better in our program where we have the support and a working relationship with the child's natural family.

One other factor that comes to mind in looking at whether a child has achieved the goal set out has to do with the quality of houseparenting that the child receives. Obviously some of our role models for the children in our homes are stronger than others, and this would be a factor in how well the child achieves his or her goals.

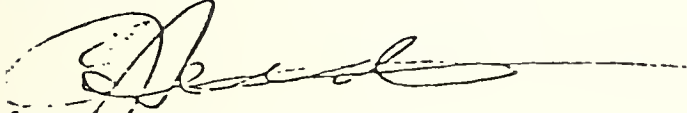
Mr. Sheldon Rahn D.S.W. April 23, 1982....Page 2....Continued

We trust this information is helpful as you examine the outcome of the study.

Thank you again for including us in this valuable exercise.

Yours truly

ASUABLE SPRINGS RANCH

A handwritten signature in dark ink, appearing to read 'Ed Heide', followed by a long horizontal line extending to the right.

ED Heide M.S.W.
Clinical Director

EH:rw

HC
117
.06
.0675
no.7/83

McCready, Douglas J.

The feasibility of
cost-outcome analysis
in Ontario social
services.

